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to my darkned Chamber, to see those various Phænomena of Light made by divers Refractions and Reflexions, and took Notes upon them; which industry if they also had used, who endeavour to explicate the aforesaid Difference between the length and breadth of this coloured *Spectrum*, by the received Laws of Refraction, would never have taken so impossible a Task in hand.

The rest is, Honoured Sir, That it is far from my Intent, that the Mistake here mentioned, do any way derogate from that learned Person: Which truly might have happened to my self, if at my first tryal thereof, the Sun had been in a white Cloud, as it seems, it happened to him. Wherefore ceasing further to trouble you, I rest,

Yours to command,

Francis Linus.

6 Octob. 1674.

Sir,

An Answer to this Letter.

THE Letter you thought fit to write by way of Animadversion upon Mr. *Newton's* new Theory of Light and Colours, grounded upon an Experiment of letting the Sun-beams through a little hole into a dark Chamber, seems to need no other Answer but this, That you would be pleased to look upon, and consider the Scheme in Mr. *Newton's* 2d Answer to *P. Pardies*, in *Numb. 85.* of the *Ph. Transactions*; and rest assured, that the Experiment, as it is represented, was tried in clear Days, and the Prism placed close to the hole in the Window, so that the Light had no room to diverge; and the colour'd Image made not parallel (as in that conjecture) but transverse to the Axis of the Prism.

London, Decem. 17. 1674.

Extracts of two Letters, written by Mr. Flamsteed to Mr. Collins; the one of Novemb. 25. 1674, concerning an Instrument to shew the Moon's true place to a minute or two; as also the Writer's design of correcting the hitherto assign'd Motions of the Sun: The other, of Decemb. 14. 1674. touching the necessity of making New Solar Numbers, together with an Expedient for making trial, whether the Refractions in Signor Cassini's Tables are just.

The Extract of the first Letter.

AFTER my return to *Derby*, I fell to peruse Mr. *Street's* Discourse, and to consider the Contrivance of his *Moon-wiser*; which though he affirms in the Conclusion of his little Tract, to be different from Mr. *Horroxes*; yet I can assure, that for the Motion of *Longitude*, 'tis the very same, and no other than what is taken from my Explication, save that, where I thought the manner of *Librating the Apogæum* was obvious from the Calculation, and needed not to be ex-

plained, he hath shewn, how to take it in the Libratory Circle. As for his *Motion of Latitude*, indeed that is a little different; but I can again assure him, not much better than Mr. *Horroxius*; to whom we are indebted for this Contrivance. Mean time, when he hath done what he can, it will not shew the true place to half a Degree.

I have therefore thought of another Contrivance, not so large, nor troublesome as his, that shall shew the Moon's true place to a Minute or two without Error, and with an Instrument, no larger than his, to less than a single Minute.

And because I find by correcting the Sun's Motions by Signor *Cassini's* Observations, that his Inequalities are 5 Minutes less in his mean distance; and that the motion of Latitude needs correction; I shall amend both, as I think and find it, in this Instrument; which, with the Place and Latitudes, will give the Moon's Semi-diameters and Parallaxes to a second.

The Extract of the other Letter.

I Think, I have been since my last a little better employed than before, I found it necessary, to make new *Solar Numbers*, because in my old I had neglected to apply *Refractions* in all the Altitudes above 30 Degrees; wherein yet Reason and some little Experience hath shew'd me, they are not insensible. I found Signor *Cassini's* Observations, which I took from *Ricciolus* his *Astronomia reformata*, much more accurate than *Tycho's*, and therefore sought out Numbers that might answer them. The *Apogæum* I found it necessary to promote 44 Minutes; so that *Anno incunte* 1655, it might be in $7^h. 30^m.$ or. and to make the greatest Equation only $1^h. 54^m. 13^s.$ whereby I found, the *Phænomena* would be answer'd much more accurately than I expected, and as near, all things consider'd, as I could desire.

But still I was uncertain, whether the *Refractions* in the said *Cassini's* Tables, were just Measures or not; and I had no Conveniencies for making Trial. At last, I thought on this Expedient, which fully satisfied me, viz.

I consider'd, That if some of those Observations of the Distances of \odot from the \odot by Day, the Stars in the Night preceeding or following, were skilfully examin'd; they might shew me the true Quantity of the Equations of the Sun's Orb, or rather the Difference of his mean and equal Motion. I turn'd over his *Progymnasmata*, and pitched on two. The first made *A.* 1585. the 5th of March, hor. 4. 42 *m.* and hor. 7. 12 *m.* p. m; whereby I found, the \odot at hor. 4. 42 *m.* was 94. 47 *m.* in antecedence of the *Lucida calvis* II. The second made *A.* 1585, the 15th. Sept. hor. 5. 15 *m.* and hor. 6. 55 *m.* mane.

Where-

Where-from (applying and considering the Refractions in both,) I found the Sun at hor. 6. 55' to be $74^{\circ}. 30'$. in consequence of the lower Head of Π . The difference of Longitude betwixt these two Stars, is $17^{\circ}. 59'$: And therefore now the Sun in consequence of the *Lucida calcis* Π $92^{\circ}. 29'$. So that the Sun's *Apparent* motion betwixt the Year 1582, the 5th of *March* at hor. 4. 42'. and the year 1585, the 15th of *Septemb.* at hor. 6. 55'. *mane* (besides the whole revolutions) was $187^{\circ}. 16'$: But the *Mean* Motion is $191^{\circ}. 2'$; greater than the *Apparent* by $3^{\circ}. 46'$: Which, parted in proportion to the Equation of the Earth's Motion, collected for those Times from my New Tables, gives the greatest Equation of the Orb, $1^{\circ}. 54'. 15''$; consenting, to my wonder, (without any wresting of the Observations) with that, which I deduced from *Cassini's* correct Meridional Altitudes.

I had not had time to examine any of those others, he hath related; nor indeed are they any ways convenient: But by this what I have done you may see, that if once we get Instruments to our purpose, that then it will not be difficult to correct the *Sun's Motions* without the consideration of the Meridional Altitudes, in which 24 Seconds error, gives the Place above one Minute amiss.

At present I use Tables, for the Sun's Motion, grounded on this Equation, which is less than *Tycho's* by no less than 9 Minutes: Which must needs cause great Alterations in our Numbers for all the other Planets; in correcting of which, I shall employ some of those Minutes I can spare from my more necessary Studies; and have hopes of good Success.

Tycho's great Equation made him commit no small Errors, and put him upon strange shifts to hide and salve them. All his Observations of the Planets in their Oppositions to the Sun, are to be corrected, before we may attempt to represent them by Numbers: For, his Errors in the Sun's place made him err sometimes 5 or 6 hours in the time of the Opposition; which must be reformed.

And that I may perform my Discourse of the Parallax of *Mars* observ'd, I shall fall upon it at my spare hours after *Christmas*.
Some Observations and Experiments made, and in a Letter communicated to the Publisher, for the R. Society, by the Learned and Inquisitive Mr. Martin Lister.

I shall venture to entertain you at present with a few loose Notes, which you will be pleas'd to take in good part, and dispose of them, as you think fitting.

I. *Of the Efflorescence of certain Mineral Gleses.*

I keep by me certain big pieces of crude Allom-Mines, such as it

was.